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Seasonal changes in the physiological characteristics of Anatolian black pine and the effect on seedling quality

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Abstract: Seasonal changes in water relations parameters, dry weight fraction (DWF), and root growth potential (RGP) were examined for Anatolian black pine [Pinus nigra Arn. subsp. pallasiana (Lamb.) Holmboe] seedlings. In addition, phenological conditions were monitored. Water relations parameters were estimated using the pressure-volume technique, including osmotic potential at full turgor ($\psi_{\pi 100}$), osmotic potential at turgor loss point ($\psi_{\pi TLP}$), free water content at turgor loss point (FWC_{TLP}), relative water content at turgor loss point (RWC_{TLP}), and symplastic water/dry weight (Vo/DW). $\psi_{\pi TLP}$, $\psi_{\pi 100}$, DWF, and RGP showed seasonal changes, but FWC_{TLP}, RWC_{TLP}, and Vo/DW did not show a clear seasonal change. The osmotic potentials ($\psi_{\pi TLP}$ and $\psi_{\pi 100}$) increased rapidly during rapid shoot elongation, then decreased gradually until autumn, and the minimum values were reached in midwinter. DWF and RGP were highest at the end of January and in mid-February, respectively. The results of the study were discussed based on nursery practices (e.g. lifting and planting time, quality of seedlings) for the species, and as a synthesis of these results, mid-November through mid-March was suggested as the lifting and planting period for bare root Anatolian black pine seedlings.

Key words: Anatolian black pine, dry weight fraction, osmotic potential, root growth potential

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